

CLAIMS

1. A method for estimating a remaining capacity of an electric storage, comprising the steps of:

monitoring a charging/discharging current of the electric storage and calculating a first remaining capacity value continuously by executing an integrating operation based on the charging/discharging current;

detecting a switching timing between charge and discharge of the electric storage, and determining, with said timing that is detected, a second remaining capacity value based on a terminal voltage of said electric battery at said timing to update the first remaining capacity value with the second remaining capacity value; and

continuing said integrating operation based on the first remaining capacity value that is updated and regarding said first remaining capacity value as the remaining capacity of the electric storage.

2. The method according to Claim 1, wherein said electric storage is a lithium ion secondary battery.

3. The method according to Claim 1, further comprising a step of referring to a look-up table that indicates a relationship between an open-circuit voltage and a remaining capacity of said electric storage and obtaining said second remaining capacity value.

4. The method according to Claim 3, wherein said electric storage is a lithium ion secondary battery.

5. An apparatus for estimating a remaining capacity of an electric storage, comprising:

current detecting means for detecting a charging/discharging current of said electric storage;

5 voltage measuring means for detecting a terminal voltage of said electric storage;

storing means for holding a value of said remaining capacity;

operating means for continuously executing an integrating operation to the value stored in said storing means based on said charging/discharging current that is detected;

10 timing detecting means for detecting a switching timing between charge and discharge of said electric storage based on an output of said current detecting means; and

remaining capacity value acquiring means for obtaining a remaining capacity value based on said terminal voltage with said timing that is detected,

15 wherein said value in said storing means is updated with the remaining capacity value obtained by said remaining capacity value acquiring means with said timing that is detected.

6. The apparatus according to Claim 5, wherein the remaining capacity of the electric storage that is a lithium ion secondary battery is estimated.

7. The apparatus according to Claim 5, wherein said remaining capacity value acquiring means has a look-up table indicating a relationship between an open-circuit voltage and the remaining capacity value of said

electric storage and refers to said look-up table based on said terminal voltage
5 to obtain said remaining capacity value.

8. The apparatus according to Claim 7, wherein the remaining capacity of the electric storage that is a lithium ion secondary battery is estimated.

9. An electric storage pack comprising:
an electric storage;
a current detector that detects a charging/discharging current of said electric storage;
5 a voltage measuring device that detects a terminal voltage of said electric storage;
a storing unit that holds and outputs a value of said remaining capacity;
an operating unit that executes an integrating operation continuously to the value stored in said storing unit based on said charging/discharging current
10 that is detected;
a timing detector that detects a switching timing between charge and discharge in said electric storage based on an output of said current detector;
and
a remaining capacity value acquiring unit that obtains a remaining
15 capacity value based on said terminal voltage with said timing that is detected,
wherein said value in said storing unit is updated with the remaining capacity value obtained by said remaining capacity value acquiring unit with said timing that is detected..

10. The electric storage pack according to Claim 9, wherein said electric storage is a lithium ion secondary battery.

11. The electric storage pack according to Claim 9, wherein a look-up table indicating a relationship between an open-circuit voltage and a remaining capacity value of said electric storage is provided in said remaining capacity value acquiring unit, and said look-up table is referred in accordance with said
5 terminal voltage to obtain said remaining capacity value.

12. The electric storage pack according to Claim 11, wherein said electric storage is a lithium ion secondary battery.